



Health Care Financing Monograph

Medicare: Hospital Use Rates of Aged
Enrollees by Health Service Area,
1974-1977

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Health Care Financing Monograph

The Health Care Financing Administration was established to combine health financing and quality assurance programs into a single agency. HCFA is responsible for the Medicare program, Federal participation in the Medicaid program, the Professional Standards Review Organization program, and a variety of other health care quality assurance programs.

The mission of the Health Care Financing Administration is to promote the timely delivery of appropriate, quality health care to its beneficiaries—approximately 47 million of the nation's aged, disabled, and poor. The Agency must also ensure that program beneficiaries are aware of the services for which they are eligible, that those services are accessible and of high quality, and that Agency policies and actions promote efficiency and quality within the total health care delivery system.

HCFA's Office of Research, Demonstrations, and Statistics (ORDS) conducts studies and projects that demonstrate and evaluate optional reimbursement, coverage, eligibility, and management alternatives to the present Federal programs. ORDS also assesses the impact of HCFA programs on health care costs, program expenditures, beneficiary access to services, health care providers, and the health care industry. In addition, ORDS monitors national health care expenditures and prices and provides actuarial analyses on the costs of current HCFA programs as well as the impact of possible legislative or administrative changes in the programs.

This monograph provides the first nationwide data on hospital use rates of Medicare enrollees by health service area from 1974 to 1977. We hope this information will aid health planners in working towards our common goal of improving the efficiency of the health care system while containing costs.

Comments and questions about this report may be addressed to Statistical Information Services, Room 2-B-14, Oak Meadows Building, 6340 Security Boulevard, Baltimore, Maryland 21207, Telephone (301) 594-6702.

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Medicare: Hospital Use Rates of Aged Enrollees by Health Service Area, 1974-1977

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Introduction

A recent study published in the *Health Care Financing Review* provided hospital use rates for Medicare enrollees age 65 and older by Professional Standards Review Organization (PSRO) area (Deacon, et al., 1979). The study focused on hospital-based use rates rather than the customary enrollee-based rates and provided a detailed discussion of the method used to compute hospital-based rates. The study also analyzed selected demographic and health resource factors in relation to the variations found in hospital use by Medicare enrollees in PSRO areas.¹ This report provides similar data by health service area and a brief discussion of the data.

The Health Planning and Resources Development Act of 1974 led to the establishment of Health Systems Agencies (HSAs) in 203 health service areas (of which there are 199 currently operating) in the United States, Puerto Rico and outlying territories. Each HSA is "responsible for preparing plans designed to improve the health of the residents in its health service area; to increase the accessibility, acceptability, continuity, and quality of health services in the area; to restrain increases in the cost of providing health services; and to prevent unnecessary duplication of health resources" (Health Planning and Resource Development Act of 1974). The primary duties of HSAs are to gather and analyze data, to establish health systems plans and annual implementation plans, and to assist States in review of proposed capital expenditures for health facilities and in review of the appropriateness of existing institutional health services.

In response to the creation of the national network of HSAs, the Health Care Financing Administration (HCFA), in cooperation with the Bureau of Health Planning, began a program to develop data from the Medicare Statistical System to help meet the needs of health planners. So far, three types of data have been developed and sent to all HSAs. They are data on Medicare enrollment by health service area, data on patterns of hospital use by Medicare patients (the MEDPAR reports), and patient origin and destination data on the flow of Medicare patients among health service areas and from counties to hospitals in health service areas.

This report presents the first nationwide data on hospital use rates of Medicare enrollees by health service areas. They are derived from records of claims for pay-

ment submitted by short-stay hospitals and are maintained in HCFA's central files. The technical note following the report gives more detail on the source of the data. Data are provided for each health service area on three measures of hospital use—discharge rate, average length of stay, and days-of-care rate—where days-of-care rate = discharge rate \times ALOS. The data can provide background information to HSAs for plan formulation and in reviewing requests for expansion of hospital facilities or services. Since the report presents four years of data, the data may be used to assess the impact of changes in facilities or services on hospital use. HSAs in areas with extreme values on any of the measures may wish to look further into possible factors behind these extremes.

Although the data apply only to Medicare enrollees age 65 and over, they, in effect, reflect the hospital experience of the entire elderly population of an area because the overwhelming majority of such persons are covered by Medicare. The Social Security Administration estimates that about 96 percent of the aged (65 and over) were covered by Medicare hospital insurance in 1977.

A study in New England indicated that hospital service areas ranking high in hospital use by Medicare enrollees also ranked high in hospital use by the entire population (Wennberg, 1980). Thus, to some extent, the data may also reflect the relative ranking of health service areas on hospital use measures for the entire population.

Methodology

Traditionally, measures of hospital use by Medicare enrollees have been based on the experience of enrollees living in a defined area. These measures are referred to as enrollee-based because they depend solely upon where the enrollee lives while the location of the hospital stay does not enter into the calculation. With the implementation of major areawide programs such as the health planning and the PSRO programs, it was necessary to develop new measures based upon use of a group of hospitals located in a defined area. These rates are referred to as hospital-based.

Hospital-based rates are constructed by including in the numerator all discharges or days of care which occur in a specific group of hospitals and including in the denominator the enrollee population-at-risk for care in that group of hospitals.

Developing the Denominator for Hospital-Based Rates

The denominator used for enrollee-based rates—the number of enrollees residing in an area—is not appropriate for hospital-based rates because some residents of an area use hospitals outside the area and some nonresidents use hospitals in the area. For example, the following data indicate that in 1976 for 12.4 percent of the health service areas, 20 percent or more of the hospital stays of residents occurred outside their health service area. The above percentage is lower than the 21.8 figure for PSROs because the guidelines for designating the boundaries of a health service area minimized patient flow among areas.

¹In general, PSRO areas and health service areas have different boundaries. In only about 20 instances are a PSRO area and a health service area the same. With regard to health service areas, 18 HSA areas are identical with the States' boundaries. The remaining States are divided into two or more health service areas, designated by a State code and number. In some instances, health service areas cross State boundaries (See Appendix B).

This report was written by George D. Lintzeris, James Lubitz, and Ronald Deacon. It was prepared in the Office of Research, Judith R. Lave, Director, and was written under the administrative supervision of Allen Dobson, Director, Division of Beneficiary Studies, and Marian Gornick, Chief of the Analytical Studies Branch.

Percentages of Discharges
of Residents of a Health
Service Area Occurring
Outside the Health Service
Area

Distribution of Health
Service Areas
(in percent)

0-9	32.7
10-19	54.9
20-29	10.4
30-39	1.0
40-49	1.0

= 12.4

From the opposite perspective of patient flow, nonresidents come into a health service area for hospital services. The distribution of the percentage of discharges of nonresidents occurring within an area is given below. It indicates that in 7.0 percent of the health service areas, 20 percent or more of the hospital stays are for nonresidents.²

Percentages of Discharges
of Non-residents of a
Health Service Area
Occurring in the
Health Service Area

Distribution of Health
Service Areas
(in percent)

0-9	36.6
10-19	56.4
20-29	4.5
30-39	2.0
40-49	0.5

= 7.0

The considerable patient flow among areas led to the development of a technique for generating a denominator or population-at-risk estimate which accounts for patient origin appropriate for use in the construction of hospital-based use rates.

The method used in this study estimates the number of enrollees-at-risk in a given health service area by allocating portions of Medicare enrollment from all health service areas based upon each area's contribution to patient load in a particular area. This method is an adaptation of one proposed by Bailey (1965) which estimated the population-at-risk for a selected group of hospitals. The following equation gives the computations underlying the denominator construction:

$$E_i = \sum_{j=1}^n \frac{d_{ij}}{D_j} e_j \quad i = 1, 2, \dots, n$$

where E_i = total number of Medicare enrollees-at-risk in the i th health service area

d_{ij} = number of discharges from hospitals in the i th area of patients who resided in the j th area

D_j = total number of discharges of patients who resided in the j th area

$$(D_j = \sum_{k=1}^n d_{kj})$$

e_j = Medicare enrollment in the j th area

n = total number of areas under consideration

Appendix A gives an example of how the adjustment is performed, and the Technical Note discusses the limitations of this technique and the associated sampling errors.

Findings

National Trends, 1967-1977

During the period 1967-1977, the discharge rate for Medicare patients in the nation increased 28 percent, rising from 271 discharges per 1,000 enrollees in 1967 to 346 per 1,000 in 1977 (Figure 1). Nationally, this rise in the discharge rate was offset by an opposite trend in the ALOS. As indicated in Figure 2, ALOS was 13.8 days in 1967 and declined to 10.9 days by 1977. As a result of these opposing trends, the days-of-care rate has changed little over the 11-year interval, registering 3,740 days of care per 1,000 enrollees in 1967 and 3,784 in 1977 (Figure 3). It should be noted, however, that during this period new technologies and services were introduced and the quantity of services per day increased, changing the nature of a day of care.

²The comparable figure for PSRO areas was 17.6 percent.

FIGURE 1
Number of Discharges Per 1,000 Medicare Enrollees
Age 65 and Over, U.S., 1967-1977



FIGURE 2
Average Length of Stay of Medicare Enrollees
Age 65 and Over, U.S., 1967-1977

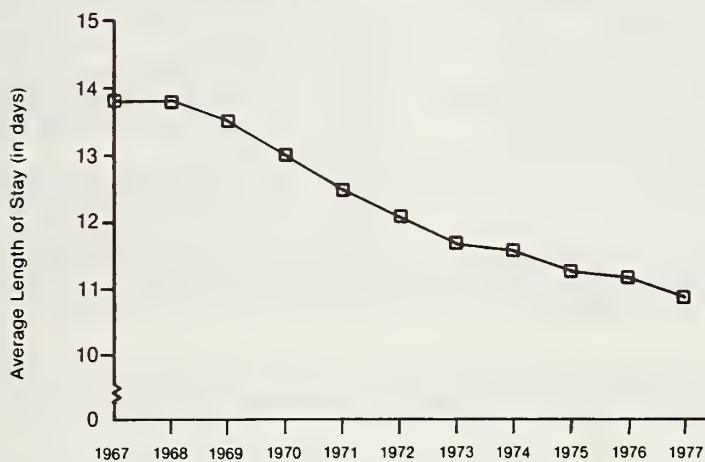
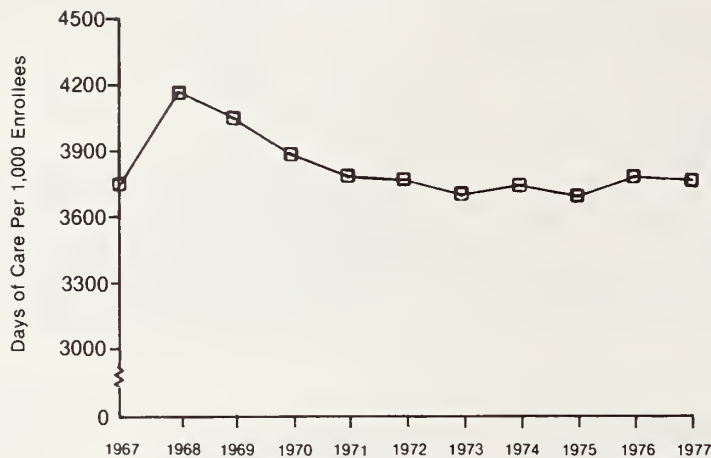


FIGURE 3
Number of Days of Care Per 1,000 Medicare Enrollees
Age 65 and Over, U.S., 1967-1977



Health Service Area Trends, 1974-1977

Table 1 shows the hospital-based measures by health service areas for the period 1974-1977 generated by the methodology previously described.³ There was a pattern of an increasing discharge rate and a declining average length of stay in nearly all health service areas during this period. Figure 4 summarizes these changes. The distribution of health service areas by percent change in these use measures is displayed. In the chart showing the discharge rates, most of the areas are to the right of the "no change" or zero point on the horizontal axis, which illustrates that the discharge rate increased in most of the health service areas during this period.

³For data-reporting purposes in this paper, the boundaries of some health service areas were changed. In addition, health service areas containing parts of two States are listed only once in Table 1. For further explanation see Appendix B.

In contrast, in the figure showing average length of stay, most of the health service areas are to the left of the "no change" point, indicating that the average length of stay declined in most areas. Only 10 areas or 5.0 percent of the total health service areas had increases in ALOS during the period.

The result of these opposite trends is reflected in the days of care rate in the bottom chart, illustrating the relatively even distribution of areas around the "no change" indicator. The distribution also shows that 110 or 54.4 percent of all areas experienced only modest changes (from -4.0 to +4.0 percent) in the days of care rate during the period 1974 to 1977.

It has sometimes been hypothesized that the greatest declines in hospital use will occur in areas where use is highest and the least declines in areas where use is lowest. This hypothesis was tested for our three measures with mixed results.

TABLE 1

Hospital-Based Measures of Short-Stay Hospital Use Adjusted for Patient Origin of Medicare Enrollees Age 65 and Over, by Health Service Area, State, and Region, 1974-1977

Region, State, and HSA	Discharges (per 1,000 enrollees)					Percent Change		Average Length of Stay (in days)					Percent Change		Days of Care (per 1,000 enrollees)					Percent Change	
	1974	1975	1976	1977	1977	1974- 1977	1977	1974	1975	1976	1977	1977	1974- 1977	1977	1974	1975	1976	1977	1977	1974- 1977	
CT001 SW Connecticut	278.8	283.7	299.3	307.9	307.9	10.4	12.9	12.9	12.6	12.4	12.1	- 6.4	3608.3	3567.9	3608.3	3567.9	3699.5	3728.3	3728.3	3.3	
CT002 South Central Conn	252.1	256.3	260.5	264.3	264.3	4.8	13.1	12.9	12.9	12.7	12.4	- 5.3	3290.7	3315.7	3290.7	3315.7	3304.5	3268.6	3268.6	- .7	
CT003 E Connecticut	273.6	273.8	279.1	280.4	280.4	2.5	11.1	10.8	10.4	10.4	10.0	- 9.2	3024.6	2954.0	3024.6	2954.0	2896.6	2815.4	2815.4	- 6.9	
CT004 North Central Conn	271.2	277.8	284.1	289.5	289.5	6.7	12.4	12.2	12.2	12.0	11.5	- 6.9	3363.0	3376.6	3363.0	3376.6	3414.2	3342.1	3342.1	- .6	
CT005 NW Connecticut	290.4	281.7	283.8	296.9	296.9	2.2	10.4	10.1	10.1	10.2	9.6	- 8.3	3025.5	2858.0	3025.5	2858.0	2901.0	2837.9	2837.9	- 6.2	
State Total	268.9	272.8	280.5	286.0	286.0	6.4	12.4	12.2	12.2	12.0	11.6	- 6.6	3346.1	3329.2	3346.1	3329.2	3362.5	3325.9	3325.9	- .6	
ME001 Maine	322.3	321.0	339.5	343.8	343.8	6.6	10.6	10.3	10.3	10.2	10.1	- 4.2	3403.5	3316.2	3403.5	3316.2	3460.0	3476.2	3476.2	2.1	
MA001 W Massachusetts	321.8	324.8	340.9	339.1	339.1	5.4	14.1	13.5	13.5	13.3	12.8	- 9.3	4541.2	4376.4	4541.2	4376.4	4535.0	4340.0	4340.0	- 4.4	
MA002 Central Mass	333.6	329.5	346.5	358.9	358.9	7.6	13.4	13.5	13.5	12.8	12.5	- 6.8	4454.9	4445.6	4454.9	4445.6	4436.7	4468.4	4468.4	- .3	
MA003 Merrimack Valley	309.8	313.4	327.5	333.4	333.4	7.6	13.6	13.7	13.7	13.6	13.5	- .8	4213.0	4297.9	4213.0	4297.9	4450.6	4494.8	4494.8	6.7	
MA004 Greater Boston	300.1	300.6	319.8	321.1	321.1	7.0	13.1	13.3	13.3	13.4	13.4	2.3	3931.4	4011.7	3931.4	4011.7	4285.2	4303.2	4303.2	9.5	
MA005 SE Massachusetts	276.0	283.5	285.4	296.2	296.2	7.3	12.8	12.4	12.4	12.3	12.8	- .6	3543.8	3511.6	3543.8	3511.6	3516.7	3781.3	3781.3	6.7	
State Total	306.1	308.5	322.8	327.7	327.7	7.1	13.4	13.4	13.4	13.2	13.1	- 1.9	4100.7	4123.8	4100.7	4123.8	4269.9	4306.5	4306.5	5.0	
NH001 United	313.7	314.2	327.6	330.3	330.3	5.3	10.7	10.2	10.2	10.0	9.9	- 8.1	3365.8	3217.3	3365.8	3217.3	3276.8	3256.5	3256.5	- 3.2	
RI001 RI Dept of Hlth	276.0	279.6	288.3	296.3	296.3	7.4	13.1	12.1	12.1	11.9	11.7	-10.8	3625.4	3395.7	3625.4	3395.7	3430.0	3471.9	3471.9	- 4.2	
VT001 Vermont	347.0	356.6	371.2	365.6	365.6	5.4	10.9	10.6	10.6	11.0	10.9	- .4	3791.3	3790.5	3791.3	3790.5	4101.5	3980.9	3980.9	5.0	
Region Total	298.8	301.5	313.9	318.6	318.6	6.6	12.6	12.4	12.4	12.2	12.1	- 4.1	3764.4	3735.1	3764.4	3735.1	3844.1	3849.8	3849.8	2.3	
NJ001 Bergen-Passaic	259.7	262.7	270.1	283.5	283.5	9.2	13.7	13.7	13.7	13.6	13.9	1.1	3568.9	3597.1	3568.9	3597.1	3674.7	3938.5	3938.5	10.4	
NJ002 Regional—Area 2	286.8	290.9	304.2	313.1	313.1	9.2	14.0	14.0	14.0	13.7	13.7	- 2.3	4009.9	4086.4	4009.9	4086.4	4177.8	4278.9	4278.9	6.7	
NJ003 Hudson	261.6	274.2	292.9	309.1	309.1	18.2	15.7	15.5	15.5	15.2	15.5	- 1.2	4106.5	4252.8	4106.5	4252.8	4466.1	4793.9	4793.9	16.7	
NJ004 Central Jersey	267.2	272.7	279.9	286.8	286.8	7.3	13.1	13.3	13.3	13.4	13.6	3.7	3496.4	3636.9	3496.4	3636.9	3758.2	3890.0	3890.0	11.3	
NJ005 S New Jersey	275.8	282.9	300.6	305.0	305.0	10.6	13.5	13.8	13.8	13.9	13.9	3.1	3717.9	3906.6	3717.9	3906.6	4181.2	4239.7	4239.7	14.0	
State Total	273.1	278.6	290.4	299.3	299.3	9.6	13.8	13.9	13.9	13.8	13.9	.8	3758.4	3866.9	3758.4	3866.9	4004.0	4150.9	4150.9	10.4	
NY001 Western New York	284.4	295.4	308.3	315.1	315.1	10.8	16.9	16.6	16.6	16.4	16.1	- 4.8	4818.9	4913.1	4818.9	4913.1	5040.7	5083.2	5083.2	5.5	
NY002 Fingerlakes	284.1	289.6	307.5	309.5	309.5	8.9	12.5	12.6	12.6	13.0	13.3	5.9	3557.2	3643.3	3557.2	3643.3	3996.5	4102.5	4102.5	15.3	
NY003 Central New York	290.2	294.1	304.1	310.0	310.0	6.8	13.6	12.8	12.8	13.2	13.1	- 4.3	3959.9	3773.3	3959.9	3773.3	4001.5	4047.2	4047.2	2.2	
NY004 NY-Penn	346.6	363.4	365.7	369.1	369.1	6.5	12.3	12.5	12.5	12.4	12.2	- .6	4261.5	4545.2	4261.5	4545.2	4547.4	4511.4	4511.4	5.9	
NY005 NE New York	315.2	318.7	330.4	339.6	339.6	7.7	14.6	14.7	14.7	14.6	14.0	- 4.0	4611.0	4671.0	4611.0	4671.0	4830.1	4768.1	4768.1	3.4	
NY006 Hudson Valley	287.9	292.8	304.7	322.2	322.2	11.9	14.1	14.1	14.1	14.0	13.6	- 3.6	4068.5	4124.2	4068.5	4124.2	4269.7	4389.1	4389.1	7.9	
NY007 New York City	257.3	268.4	277.1	289.3	289.3	12.4	17.8	17.7	17.7	17.7	16.6	- 6.5	4578.6	4760.7	4578.6	4760.7	4895.3	4813.2	4813.2	5.1	
NY008 Nassau-Suffolk	246.3	249.4	260.4	275.9	275.9	12.0	13.5	13.7	13.7	14.1	14.2	5.2	3332.3	3409.7	3332.3	3409.7	3669.8	3928.2	3928.2	17.9	
State Total	272.5	280.7	291.2	302.4	302.4	11.0	15.7	15.6	15.6	15.7	15.1	- 4.0	4291.7	4392.0	4291.7	4392.0	4558.7	4571.7	4571.7	6.5	
PR001 Hlth Ping Dep	226.8	227.9	237.0	233.6	233.6	3.0	12.5	11.8	11.8	11.3	10.8	-13.7	2828.6	2684.6	2828.6	2684.6	2683.7	2513.9	2513.9	-11.1	
Region Total	269.5	276.4	287.0	296.4	296.4	10.0	15.1	15.0	15.0	14.9	14.5	- 3.5	4058.8	4139.0	4058.8	4139.0	4282.3	4306.4	4306.4	6.1	
DE001 Delaware	260.0	266.6	280.4	290.5	290.5	11.7	13.3	12.6	12.6	13.1	12.6	- 5.2	3459.8	3362.0	3459.8	3362.0	3664.9	3664.9	3664.9	5.9	
DC001 State Agcy Affairs	250.3	255.6	268.0	275.4	275.4	10.0	14.2	14.7	14.7	14.3	14.3	1.2	3544.4	3762.2	3544.4	3762.2	3843.5	3946.4	3946.4	11.3	
MD001 Western Maryland	281.5	295.5	303.8	311.0	311.0	10.5	12.2	12.4	12.4	12.0	12.0	- 1.7	3423.1	3669.4	3423.1	3669.4	3642.6	3717.7	3717.7	8.6	
MD002 Montgomery County	275.2	258.6	280.3	287.6	287.6	4.5	12.2	11.9	11.9	12.1	11.8	- 3.8	3367.2	3085.7	3367.2	3085.7	3392.2	3383.7	3383.7	.5	
MD003 Southern Maryland	276.0	296.7	315.1	334.1	334.1	21.0	12.3	12.0	12.0	12.1	12.7	2.6	3405.9	3569.7	3405.9	3569.7	3803.5	4228.4	4228.4	24.1	
MD004 Central Maryland	244.3	255.5	268.6	277.8	277.8	13.7	14.0	14.0	14.0	14.1	13.8	- 1.0	3412.1	3583.6	3412.1	3583.6	3793.4	3840.5	3840.5	12.6	
MD005 Eastern Shore	265.3	269.3	283.1	304.9	304.9	15.0	11.0	11.2	11.2	10.8	10.7	- 3.0	2930.7	3026.3	2930.7	3026.3	3053.2	3267.4	3267.4	11.5	
State Total	255.9	264.3	278.5	289.4	289.4	13.1	13.1	13.2	13.2	13.1	12.9	- 1.4	3361.2	3482.4	3361.2	3482.4	3659.5	3746.1	3746.1	11.5	
PA001 SE Pennsylvania	274.7	285.0	297.7	308.0	308.0	12.1	14.4	14.0	14.0	13.9	14.0	- 2.8	3950.5	3979.1	3950.5	3979.1	4151.8	4303.3	4303.3	8.9	
PA002 E Pennsylvania	243.1	254.3	271.2	279.6	279.6	15.0	13.9	13.1	13.1	12.7	12.4	-10.9	3379.3	3326.2	3379.3	3326.2	3445.3	3463.5	3463.5	2.5	
PA003 NE Pennsylvania	288.1	302.8	315.9	325.0	325.0	12.8	13.5	12.6	12.6	12.6	12.8	- 4.9	3896.2	3810.3	3896.2	3810.3	3993.5	4167.3	4167.3	7.2	
PA004 Hlth Resources	247.6	253.1	258.8	263.9	263.9	6.6	13.4	12.8	12.8	12.8	12.4	- 7.5	3311.3	3251.1	3311.3	3251.1	3315.8	3264.1	3264.1	- 1.4	

TABLE 1
Hospital-Based Measures of Short-Stay Hospital Use Adjusted for Patient Origin
of Medicare Enrollees Age 65 and Over, by Health Service Area, State, and Region, 1974-1977 (continued)

Region, State, and HSA	Discharges (per 1,000 enrollees)				Percent Change		Average Length of Stay (in days)				Percent Change		Days of Care (per 1,000 enrollees)				Percent Change	
	1974	1975	1976	1977	1974- 1977	1977	1974	1975	1976	1977	1974- 1977	1977	1974	1975	1976	1977	1974- 1977	1977
PA005 Central Penn	307.3	319.1	326.5	326.8	6.3	326.8	11.4	10.7	10.4	10.2	-10.0	10.2	3497.5	3429.5	3403.2	3346.6	-4.3	
PA006 SW Pennsylvania	314.4	321.6	332.7	343.5	9.2	343.5	12.8	12.4	12.4	12.2	-4.2	12.2	4014.3	3987.9	4109.2	4199.6	4.6	
PA007 NW Pennsylvania	338.2	352.0	364.4	367.1	8.6	367.1	11.5	11.2	11.1	11.0	-4.8	11.0	3889.3	3927.2	4041.7	4020.2	3.4	
PA009 Keystone	328.1	337.8	341.2	351.6	7.2	351.6	12.3	11.9	11.9	11.7	-5.0	11.7	4030.6	4003.6	4076.0	4102.3	1.8	
State Total	288.8	298.4	309.5	317.9	10.1	317.9	13.2	12.7	12.7	12.6	-5.0	12.6	3820.0	3800.4	3923.5	3992.8	4.5	
VA001 NW Virginia	313.6	316.0	330.2	329.4	5.0	329.4	12.5	11.6	11.5	11.4	-8.8	11.4	3910.6	3652.4	3802.2	3746.2	-4.2	
VA002 NE Virginia	296.1	293.9	304.2	313.8	6.0	313.8	12.7	12.2	11.9	11.3	-10.3	11.3	3746.4	3571.5	3614.9	3559.7	-5.0	
VA003 SW Virginia	349.7	365.9	368.4	373.3	6.7	373.3	12.4	11.7	11.5	11.4	-8.1	11.4	4335.5	4295.5	4253.9	4252.1	-1.9	
VA004 Central Virginia	296.3	310.7	314.0	321.4	8.5	321.4	13.6	12.7	13.1	13.2	-3.3	13.2	4034.8	3955.4	4118.7	4230.1	4.8	
VA005 Eastern Virginia	296.4	299.4	313.7	331.2	11.8	331.2	13.8	13.0	12.9	12.2	-11.4	12.2	4077.3	3880.2	4058.3	4036.7	-1.0	
State Total	314.1	322.5	330.7	338.3	7.7	338.3	13.0	12.2	12.2	11.9	-8.0	11.9	4076.5	3940.6	4036.0	4039.3	-9.9	
WV001 West Virginia	380.7	386.0	400.9	390.6	2.6	390.6	11.5	10.9	10.7	10.6	-7.9	10.6	4375.9	4204.2	4307.8	4133.6	-5.5	
Regional Total	294.8	303.4	314.9	321.8	9.2	321.8	13.0	12.5	12.5	12.3	-5.1	12.3	3834.6	3807.0	3933.0	3971.2	3.6	
AL001 North Alabama	392.7	391.2	413.2	423.4	7.8	423.4	10.4	9.9	9.6	9.0	-12.9	9.0	4075.4	3873.3	3960.7	3827.2	-6.1	
AL002 West Alabama	357.6	350.3	387.8	405.6	13.4	405.6	9.5	9.4	8.9	8.6	-10.0	8.6	3401.0	3285.7	3466.9	3473.9	2.1	
AL003 Birmingham Region	336.4	337.2	357.0	374.9	11.4	374.9	11.2	10.9	10.9	10.6	-6.1	10.6	3781.6	3676.9	3874.8	3958.2	4.7	
AL004 Hlth Sys Agency	356.6	370.3	377.0	388.3	8.9	388.3	9.8	9.8	9.6	9.3	-5.5	9.3	3500.3	3613.1	3626.9	3602.7	2.9	
AL005 SE Alabama	370.7	370.7	384.1	394.3	6.3	394.3	9.7	9.4	9.2	9.0	-7.6	9.0	3596.0	3480.6	3533.5	3531.9	-1.8	
AL006 SW Alabama	367.8	365.4	384.1	396.2	7.7	396.2	10.1	10.1	10.1	9.6	-4.2	9.6	3704.6	3681.1	3865.9	3823.3	3.2	
State Total	361.6	362.4	380.6	394.0	9.0	394.0	10.3	10.1	9.9	9.5	-7.3	9.5	3725.2	3643.6	3770.9	3761.9	1.0	
FL001 Florida Panhandle	395.3	392.7	419.3	434.9	10.0	434.9	9.1	8.8	8.8	8.8	-3.4	8.8	3598.0	3467.2	3681.1	3822.6	6.2	
FL002 N Central Florida	320.1	332.6	346.4	352.7	10.2	352.7	9.2	9.1	9.0	8.6	-6.7	8.6	2960.4	3012.5	3123.6	3042.4	2.8	
FL003 NE Florida	346.6	352.0	368.3	387.9	11.9	387.9	10.5	10.2	10.2	9.9	-5.2	9.9	3623.6	3590.7	3770.4	3844.6	6.1	
FL004 Florida Gulf	282.1	284.5	300.8	313.4	11.1	313.4	10.8	10.6	10.5	10.3	-4.6	10.3	3039.4	3026.5	3164.4	3222.0	6.0	
FL005 E Central Florida	338.0	342.0	348.9	355.4	5.1	355.4	10.6	10.4	10.3	10.0	-5.2	10.0	3576.2	3545.7	3610.1	3564.5	-3.3	
FL006 S Central Florida	294.3	307.7	319.2	323.8	10.0	323.8	10.1	9.8	9.8	9.4	-6.7	9.4	2965.2	3023.4	3130.0	3043.5	2.6	
FL007 Hlth Ping Area 7	263.5	272.3	288.1	293.0	11.2	293.0	9.4	9.2	9.3	9.2	-2.0	9.2	2473.4	2510.3	2687.6	2696.5	9.0	
FL008 Broward County	307.2	323.0	341.0	351.8	14.5	351.8	10.2	9.9	9.8	9.7	-4.6	9.7	3122.8	3209.6	3353.5	3413.6	9.3	
FL009 South Florida	354.6	361.7	381.2	388.2	9.5	388.2	10.8	10.6	10.5	10.5	-3.4	10.5	3842.6	3824.8	4018.0	4062.7	5.7	
State Total	314.7	322.0	337.5	346.6	10.1	346.6	10.3	10.1	10.0	9.8	-4.7	9.8	3246.7	3248.2	3390.1	3406.2	4.9	
GA002 Appalachian Ga	361.9	355.9	373.8	397.1	9.7	397.1	8.3	8.1	8.0	7.8	-6.4	7.8	3014.6	2870.6	2985.5	3095.5	2.7	
GA003 N Central Georgia	306.0	317.3	328.8	349.9	14.3	349.9	9.8	9.6	9.5	9.3	-5.2	9.3	3013.5	3060.8	3111.0	3264.8	8.3	
GA004 E Central Georgia	334.4	330.5	346.5	359.7	7.6	359.7	10.3	9.6	9.5	9.6	-6.3	9.6	3439.7	3172.4	3296.8	3466.0	.8	
GA005 Central Georgia	349.9	331.4	357.4	372.2	6.4	372.2	10.0	9.6	9.3	9.2	-7.7	9.2	3493.2	3196.0	3340.7	3430.4	-1.8	
GA006 SW Georgia	390.1	387.6	391.8	399.3	2.4	399.3	8.5	8.1	8.0	7.9	-6.6	7.9	3306.7	3128.6	3146.3	3162.2	-4.4	
GA007 SE Georgia	413.5	409.1	414.4	422.9	2.3	422.9	9.9	9.2	9.1	9.2	-7.8	9.2	4110.3	3769.4	3787.8	3876.9	-5.7	
State Total	345.6	344.9	358.0	374.3	8.3	374.3	9.6	9.2	9.0	9.0	-6.3	9.0	3305.3	3166.3	3239.7	3356.1	1.5	
KY001 W Kentucky	349.3	353.6	365.2	375.3	7.4	375.3	10.8	10.7	10.7	10.4	-3.9	10.4	3788.1	3789.6	3917.9	3912.6	3.3	
KY002 E Kentucky	373.0	382.1	390.2	398.6	6.8	398.6	9.4	9.4	9.3	9.3	-1.5	9.3	3504.4	3595.1	3615.0	3689.5	5.3	
State Total	359.5	365.9	375.9	385.2	7.1	385.2	10.2	10.1	10.1	9.9	-2.8	9.9	3665.0	3706.0	3788.5	3817.4	4.2	
MS001 Mississippi	417.8	426.6	434.6	446.0	6.8	446.0	10.3	10.0	10.1	10.0	-3.2	10.0	4316.5	4285.1	4377.7	4459.9	3.3	
NC001 W North Carolina	335.4	361.5	366.9	368.2	9.8	368.2	11.3	10.6	10.5	10.4	-7.6	10.4	3781.7	3820.4	3848.1	3837.5	1.5	
NC002 Piedmont	291.0	292.6	296.3	308.1	5.9	308.1	12.4	11.8	11.7	11.5	-7.1	11.5	3611.9	3472.7	3472.7	3553.6	-1.6	
NC003 S Piedmont	314.6	315.2	326.6	328.7	4.5	328.7	12.6	11.9	11.7	11.5	-8.7	11.5	3953.3	3748.9	3805.8	3769.5	-4.6	
NC004 Capital	298.1	298.1	309.5	315.7	5.9	315.7	12.3	11.9	11.9	11.8	-4.6	11.8	3676.4	3558.5	3683.9	3715.1	1.1	
NC005 Cardinal	338.6	347.5	348.8	352.2	4.0	352.2	11.3	10.9	10.7	10.5	-6.7	10.5	3818.9	3772.8	3739.3	3706.3	-2.9	

TABLE 1
Hospital-Based Measures of Short-Stay Hospital Use Adjusted for Patient Origin
of Medicare Enrollees Age 65 and Over, by Health Service Area, State, and Region, 1974-1977 (continued)

Region, State, and HSA	Discharges (per 1,000 enrollees)			Percent Change		Average Length of Stay (in days)			Percent Change		Days of Care (per 1,000 enrollees)			Percent Change	
	1974	1975	1976	1977	1974- 1977	1974	1975	1976	1977	1974- 1977	1974	1975	1976	1977	1974- 1977
NC006 E Carolina															
State Total	308.8	321.7	329.9	338.5	9.6	11.9	11.5	11.4	11.3	- 5.2	3670.8	3698.3	3772.0	3815.1	3.9
SC001 SC Appalachian	313.7	322.2	329.3	334.9	6.8	11.9	11.4	11.3	11.1	- 6.7	3748.7	3670.5	3717.0	3732.2	- .4
SC002 Three Rivers	249.5	263.1	302.6	313.2	25.5	10.7	10.7	10.7	10.8	1.1	2669.8	2812.7	3246.5	3388.0	26.9
SC003 Pee Dee Region	281.7	287.5	286.1	295.9	5.1	10.8	10.7	10.7	10.6	- 2.2	3050.8	3078.2	3056.6	3134.8	2.8
SC004 Palmetto-Lowcntry	380.0	382.2	374.4	395.4	4.1	9.2	9.2	8.8	8.6	- 6.1	3495.9	3512.3	3299.9	3414.7	- 2.3
State Total	287.8	286.6	305.6	315.0	9.4	10.8	11.0	10.8	10.6	- 2.6	3121.5	3156.8	3290.3	3328.8	6.6
State Total	293.0	299.1	313.5	325.5	11.1	10.4	10.4	10.2	10.2	- 1.8	3035.2	3097.2	3212.9	3311.8	9.1
TN001 Tenn Appalachian															
TN002 E Tennessee	341.4	349.3	355.9	366.4	7.3	11.4	11.4	11.3	11.2	- 2.3	3901.2	3975.7	4036.5	4089.9	4.8
TN003 Georgia-Tennessee	359.8	368.2	380.3	390.2	8.5	10.6	10.3	10.2	9.8	- 7.3	3805.7	3775.8	3885.8	3825.1	- .5
TN004 Middle Tennessee	352.8	358.1	368.9	388.6	10.2	9.8	9.4	9.3	9.3	- 5.3	3482.1	3373.4	3431.5	3610.8	4.3
TN005 W Tennessee	380.8	385.6	401.6	419.4	10.1	10.9	10.5	10.3	10.0	- 8.8	4163.2	4044.9	4119.6	4182.3	- .5
State Total	346.1	367.5	375.1	397.5	14.9	10.2	9.8	9.7	9.6	- 5.7	3529.5	3604.1	3633.4	3824.3	8.4
TN006 Mid-South Med Ctr	324.7	325.1	340.0	347.7	7.1	12.9	12.6	12.4	12.1	- 5.9	4180.3	4101.4	4201.4	4213.9	- .8
State Total	354.9	361.6	374.2	388.5	9.5	11.1	10.7	10.6	10.3	- 6.6	3924.8	3877.0	3953.1	4011.9	2.2
Region Total															
Region Total	337.1	342.6	355.5	366.0	8.6	10.5	10.2	10.1	10.0	- 5.3	3544.4	3507.4	3608.2	3645.4	2.8
IL001 NW Illinois															
IL002 Illinois Central	330.2	328.1	337.5	347.2	5.1	10.5	10.3	10.2	9.8	- 6.7	3455.0	3374.9	3447.9	3390.5	- 1.9
IL003 W Central Illinois	376.0	372.9	386.9	395.4	5.2	12.1	11.4	11.4	11.2	- 8.1	4565.4	4251.2	4405.2	4411.9	- 3.4
IL004 E Central Illinois	403.8	397.3	411.4	414.7	2.7	11.3	11.2	10.9	11.0	- 1.8	4542.9	4438.3	4483.1	4580.1	- .8
IL005 S Illinois	376.8	369.3	376.1	381.0	1.1	10.7	10.2	10.1	10.0	- 7.0	4033.3	3782.8	3787.7	3793.5	- 5.9
IL007 Cook/Dupage	393.9	403.3	416.6	415.1	5.4	9.7	9.4	9.3	9.4	- 3.3	3822.9	3908.0	3879.2	3894.7	1.9
IL008 Kane/Lake/McHenry	306.6	313.7	327.7	334.4	9.1	14.2	13.8	14.0	13.5	- 4.4	4338.2	4334.6	4571.6	4524.1	4.3
IL009 Region 9	310.9	316.6	327.7	336.2	8.2	12.1	11.4	11.4	11.2	- 7.4	3752.0	3621.8	3721.6	3758.1	- 2
State Total	321.0	327.0	337.9	352.1	9.7	12.9	12.1	12.5	12.1	- 6.1	4145.7	3965.0	4233.2	4268.4	3.0
State Total	334.6	338.0	350.9	357.0	6.7	12.6	12.2	12.3	12.0	- 4.5	4213.8	4138.5	4305.4	4291.8	1.9
IN001 N Indiana															
IN002 Central Indiana	303.3	303.4	313.3	319.3	5.3	12.4	12.0	11.9	11.3	- 8.5	3760.4	3650.1	3730.2	3623.2	- 3.6
IN003 S Indiana	308.4	317.0	329.3	335.3	8.7	12.7	12.4	12.4	11.9	- 6.2	3924.6	3931.2	4082.4	4006.6	1.9
State Total	350.5	357.5	373.2	378.8	8.1	11.4	10.9	10.9	10.7	- 5.8	3994.6	3993.3	4065.8	4065.8	1.8
State Total	318.2	323.5	336.0	341.7	7.4	12.2	11.8	11.8	11.4	- 6.8	3888.1	3825.9	3958.0	3889.2	.0
MI001 SE Michigan															
MI002 Michigan Mid-South	301.6	316.2	327.9	340.6	12.9	13.8	13.4	13.1	13.0	- 5.9	4155.7	4237.4	4308.8	4413.8	6.2
MI003 SW Michigan	321.8	330.5	339.5	347.3	7.9	11.5	11.4	10.8	11.0	- 4.3	3684.7	3767.3	3681.4	3806.3	3.3
MI004 W Michigan	337.4	342.6	349.9	359.1	6.4	11.3	10.9	10.8	10.3	- 9.0	3818.4	3734.9	3772.7	3700.0	- 3.1
MI005 Genes/Lape/Shiawas	288.9	301.9	313.9	320.2	10.8	11.4	10.9	10.6	10.2	- 10.4	3291.9	3285.8	3334.9	3268.6	- .7
MI006 E Central Michigan	333.0	338.1	354.1	356.0	6.9	13.8	13.2	13.0	12.7	- 8.2	4596.7	4456.3	4600.1	4512.6	- 1.8
MI007 N Michigan	342.0	350.8	358.9	364.3	6.5	11.4	11.0	10.6	10.0	- 11.9	3889.4	3846.4	3787.0	3651.0	- 6.1
MI008 Upper Peninsula	347.8	353.0	353.9	357.2	2.7	11.4	11.0	10.9	10.7	- 6.4	3973.8	3893.5	3852.1	3821.3	- 3.8
State Total	375.3	378.2	391.5	378.8	1.0	12.3	11.9	11.4	11.1	- 9.3	4598.2	4513.4	4450.6	4209.7	- 8.4
State Total	315.2	326.4	337.1	345.6	9.6	12.7	12.3	12.0	11.8	- 7.2	4004.1	4022.3	4060.0	4072.7	1.7
MN002 W Lake Superior															
MN004 Central Minnesota	422.8	400.3	398.1	408.6	- 3.4	11.5	11.3	10.9	10.2	- 11.1	4841.7	4517.1	4337.6	4157.9	- 14.1
MN005 Metropolitan	395.5	401.0	404.7	394.5	- .3	10.1	10.1	9.4	9.0	- 10.7	3984.5	4032.6	3820.2	3549.3	- 10.9
MN006 Minnesota HSA Six	394.3	386.8	398.4	384.5	- 2.5	11.7	11.6	11.3	10.8	- 8.2	4624.8	4473.7	4503.4	4140.9	- 10.5
MN007 SE Minnesota	357.6	361.2	373.8	367.6	2.8	10.0	9.7	9.2	8.7	- 12.6	3577.3	3520.4	3427.0	3214.2	- 10.1
State Total	326.1	329.0	335.1	337.5	3.5	11.5	11.1	10.8	10.3	- 10.5	3751.7	3639.4	3618.8	3474.6	- 7.4
State Total	381.1	376.3	384.4	378.2	- .8	11.2	11.0	10.7	10.5	- 9.7	4276.4	4145.8	4098.8	3831.0	- 10.4
OH001 C Ohio Riv Valley															
OH002 Miami Valley	290.5	302.7	310.5	321.2	10.6	13.5	13.0	12.8	12.5	- 7.8	3925.2	3934.3	3966.9	4002.3	2.0
OH003 W Central Ohio	287.0	292.3	308.0	318.8	11.1	12.7	12.5	12.3	11.8	- 7.7	3654.5	3782.7	3746.0	3746.0	2.5
State Total	330.0	340.6	343.3	342.8	3.9	10.6	10.3	10.6	10.4	2.4	3508.1	3515.4	3628.3	3556.0	1.4

TABLE 1
Hospital-Based Measures of Short-Stay Hospital Use Adjusted for Patient Origin
of Medicare Enrollees Age 65 and Over, by Health Service Area, State, and Region, 1974-1977 (continued)

Region, State, and HSA	Discharges (per 1,000 enrollees)				Percent Change		Average Length of Stay (in days)				Percent Change		Days of Care (per 1,000 enrollees)				Percent Change	
	1974	1975	1976	1977	1974- 1977		1974	1975	1976	1977	1974- 1977		1974	1975	1976	1977	1974- 1977	
OH004 NW Ohio	335.9	351.3	355.6	362.6	7.9		11.5	11.0	11.0	10.7	- 6.6		3854.9	3867.1	3906.0	3887.9	- 9	
OH005 Mid-Ohio	297.5	309.7	319.5	330.8	11.2		12.7	12.6	12.5	12.2	- 3.8		3774.5	3889.3	4006.7	4036.1	- 6.9	
OH006 Area Six	370.3	379.6	383.3	386.3	4.3		11.7	11.4	11.4	11.1	- 4.7		4332.0	4344.5	4373.4	4304.9	- 1.7	
OH007 Hlth Plng Dvlpmnt	304.7	323.1	318.9	331.2	8.7		11.7	11.2	11.0	10.9	- 6.4		3555.6	3606.5	3508.6	3617.6	- 3.3	
OH008 Summit Portage	302.1	292.8	312.2	322.1	6.6		12.9	12.8	12.7	12.5	- 3.1		3903.9	3736.2	3969.9	4031.4	- 3.3	
OH009 Metropolitan	299.9	304.0	313.4	319.1	6.4		13.3	13.2	13.2	12.8	- 3.9		3994.3	4001.6	4133.8	4083.9	- 2.2	
OH010 E Ohio	322.3	322.2	334.8	343.1	6.5		12.9	12.6	12.8	12.6	- 2.9		4165.8	4070.4	4282.7	4306.7	- 3.4	
State Total	308.5	316.7	325.1	333.3	8.0		12.6	12.3	12.3	12.0	- 5.1		3887.3	3896.5	3987.7	3987.1	- 2.6	
WI001 Hlth Plng Council	321.7	328.9	340.7	338.9	5.3		11.3	10.8	10.2	9.9	- 12.6		3633.1	3561.8	3477.4	3343.4	- 8.0	
WI002 SE Wisconsin	297.2	298.7	302.0	312.5	5.2		13.1	12.7	12.4	12.2	- 6.4		3885.7	3787.5	3741.4	3825.3	- 1.6	
WI003 Lake Winnebago	346.4	343.2	338.8	346.2	- .1		12.6	11.6	11.3	11.2	- 11.7		4379.6	3973.5	3841.9	3863.6	- 11.8	
WI004 NE Wisconsin	342.2	337.5	342.8	339.7	- .7		11.6	11.3	11.2	10.8	- 7.2		3974.0	3809.0	3840.4	3661.6	- 7.9	
WI005 W Wisconsin	398.8	391.9	401.2	399.6	.2		10.4	9.9	9.4	9.2	- 11.6		4142.9	3892.2	3771.5	3669.1	- 11.4	
WI006 N Central Area	344.1	331.6	355.0	348.0	1.1		10.8	10.5	9.9	9.8	- 8.7		3711.6	3466.1	3501.3	3427.2	- 7.7	
State Total	331.6	330.3	337.2	340.1	2.6		11.8	11.4	11.0	10.8	- 9.0		3923.3	3751.4	3697.4	3660.8	- 6.7	
Region Total	326.9	331.8	341.9	347.4	6.3		12.3	12.0	11.8	11.5	- 6.4		4029.5	3976.2	4049.6	4009.2	- .5	
AR001 W Arkansas	405.5	408.2	420.6	424.4	4.7		9.7	9.4	9.0	8.8	- 9.2		3933.8	3822.9	3794.7	3736.3	- 5.0	
AR002 Delta-Hills	429.7	422.3	438.9	453.0	5.4		8.7	8.5	8.1	8.0	- 8.5		3747.1	3573.0	3544.8	3615.3	- 3.5	
AR003 Central Arkansas	374.1	373.2	394.6	397.7	6.3		10.4	10.2	9.9	9.8	- 5.6		3895.4	3799.1	3923.2	3910.1	- .4	
AR004 S Arkansas	407.9	411.2	422.5	442.7	8.5		9.8	9.3	9.0	8.7	- 10.8		3986.8	3804.9	3782.9	3860.2	- 3.2	
State Total	405.4	404.9	419.8	429.1	5.8		9.6	9.3	9.0	8.8	- 8.5		3895.2	3757.9	3762.1	3772.0	- 3.2	
LA001 New Orl/Bayou Riv	302.2	300.7	314.9	330.1	9.2		12.5	12.4	12.4	12.0	- 3.4		3763.1	3737.7	3899.5	3972.1	- 5.6	
LA002 Mid-Louisiana	412.7	412.8	421.9	432.5	4.8		8.9	8.6	8.6	8.5	- 3.7		3659.1	3561.6	3620.6	3692.0	- .9	
LA003 N Louisiana	400.9	403.4	419.5	429.1	7.0		8.8	8.7	8.7	8.5	- 3.0		3528.5	3507.3	3656.5	3665.0	- 3.9	
State Total	370.5	370.7	384.2	395.6	6.8		9.8	9.7	9.7	9.6	- 3.0		3648.7	3602.7	3727.3	3780.3	- 3.6	
NM001 New Mexico	325.6	326.3	333.4	329.8	1.3		9.0	9.0	9.0	8.6	- 4.9		2937.6	2930.3	2987.6	2828.9	- 3.7	
OK001 Oklahoma	401.3	394.4	401.1	395.7	- 1.4		9.3	9.0	8.9	9.0	- 3.6		3729.7	3567.1	3584.8	3546.2	- 4.9	
TX001 Panhandle	439.4	431.9	433.4	447.6	1.9		9.7	9.3	8.8	8.8	- 9.8		4268.1	4017.0	3800.4	3922.9	- 8.1	
TX002 South Plains	466.1	453.0	464.3	471.4	1.1		9.1	8.8	8.9	8.8	- 2.9		4230.5	3975.3	4123.0	4156.0	- 1.8	
TX003 W Texas	345.4	355.4	375.4	388.1	12.4		11.5	11.3	10.9	10.4	- 9.7		3974.3	4017.7	4086.0	4034.1	- 1.5	
TX004 Tri-Region	445.3	447.5	462.0	478.1	7.4		9.6	9.2	9.2	8.9	- 7.7		4281.9	4139.2	4234.7	4244.6	- .9	
TX005 Texas Area 5	359.7	363.3	374.4	387.3	7.7		10.4	10.1	10.0	9.8	- 6.4		3748.2	3669.3	3737.8	3777.8	- .8	
TX006 Central Texas	365.3	374.8	384.0	390.1	6.8		10.3	9.8	9.8	9.3	- 9.7		3760.2	3669.9	3744.8	3624.7	- 3.6	
TX007 NE Texas	421.8	413.6	425.7	434.3	3.0		9.4	8.9	8.6	8.4	- 10.5		3979.0	3675.3	3668.3	3666.1	- 7.9	
TX008 S Texas	384.0	387.6	403.7	411.4	7.1		9.9	9.5	9.4	9.0	- 8.2		3784.1	3680.9	3796.5	3719.5	- 1.7	
TX009 Camino Real	335.1	339.1	355.8	365.4	9.0		10.5	10.3	10.3	10.0	- 4.1		3508.1	3492.0	3656.6	3670.0	- 4.6	
TX010 Greater E Texas	457.5	462.3	474.9	477.2	4.3		10.3	10.0	10.0	9.8	- 4.7		4692.7	4637.2	4756.1	4666.2	- .6	
TX011 Houston-Galveston	390.0	392.9	404.5	413.6	6.1		11.0	10.7	10.6	10.5	- 4.9		4285.9	4214.3	4281.8	4323.2	- .9	
TX012 Permian Basin	436.5	428.1	433.5	437.5	.2		8.6	8.3	8.7	8.3	- 4.5		3772.0	3570.0	3772.5	3610.9	- 4.3	
State Total	388.9	390.9	403.1	412.8	6.2		10.2	9.9	9.8	9.5	- 6.7		3969.5	3862.0	3937.8	3932.3	- .9	
Region Total	387.3	387.4	399.1	406.4	4.9		9.9	9.6	9.5	9.3	- 5.8		3834.5	3729.0	3794.7	3789.0	- 1.2	
IA001 Iowa	371.9	372.4	384.8	383.1	3.0		10.7	10.4	10.0	9.6	- 9.8		3971.8	3877.9	3866.9	3690.9	- 7.1	
IA003 Illinois	360.9	374.8	369.7	376.6	4.3		11.4	10.9	10.4	10.3	- 9.4		4101.4	4091.6	3844.9	3875.3	- 5.5	
State Total	370.6	372.7	383.0	382.4	3.2		10.8	10.5	10.1	9.7	- 9.7		3987.1	3902.6	3864.3	3712.7	- 6.9	
KS001 W Kansas	493.0	491.7	505.0	507.7	3.0		10.6	10.2	10.1	9.7	- 8.3		5216.9	5001.6	5079.7	4928.9	- 5.5	
KS002 NE Kansas	373.7	380.2	399.6	393.8	5.4		11.4	10.9	10.9	10.6	- 7.2		4270.1	4151.2	4356.2	4175.5	- 2.2	

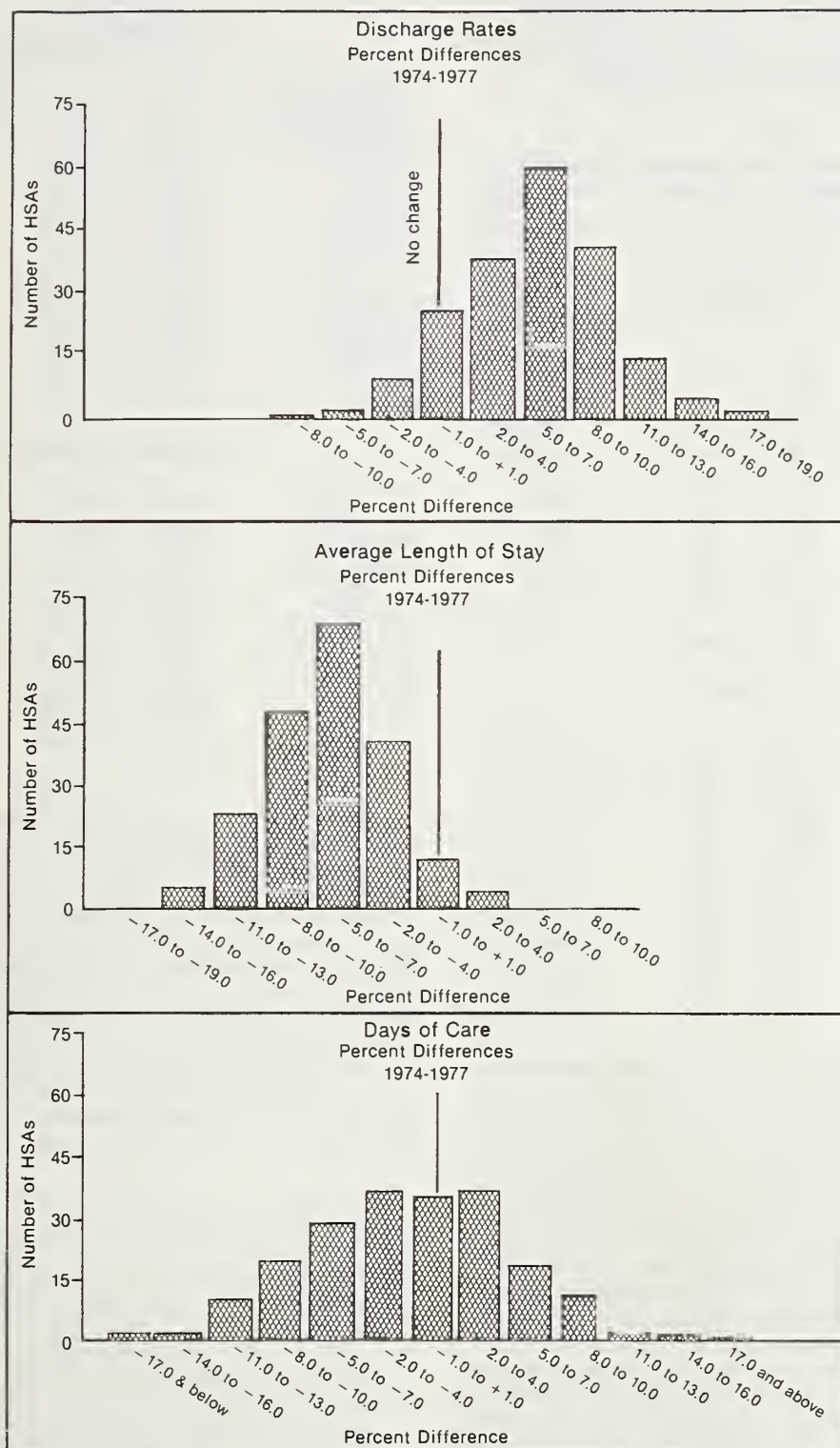
TABLE 1
Hospital-Based Measures of Short-Stay Hospital Use Adjusted for Patient Origin
of Medicare Enrollees Age 65 and Over, by Health Service Area, State, and Region, 1974-1977 (continued)

Region, State, and HSA	Discharges (per 1,000 enrollees)				Percent Change		Average Length of Stay (in days)				Percent Change		Days of Care (per 1,000 enrollees)				Percent Change	
	1974	1975	1976	1977	1974- 1977	1977	1974	1975	1976	1977	1974- 1977	1977	1974	1975	1976	1977	1974- 1977	1977
KS003 SE Kansas	429.2	432.8	452.2	452.2	5.4	10.7	10.5	10.5	10.3	9.9	- 7.7	4594.4	4549.1	4642.3	4468.6	- 2.7		
State Total	430.3	433.5	451.6	450.5	4.7	10.8	10.5	10.4	10.4	10.0	- 7.7	4664.4	4556.5	4677.4	4505.9	- 3.4		
MO001 Mid-America	344.8	350.3	360.0	367.3	6.5	12.1	12.2	11.7	11.6	11.6	- 4.2	4185.2	4276.9	4227.7	4272.4	2.1		
MO002 Area 2 Missouri	373.7	389.8	400.6	409.5	9.6	11.4	11.1	11.1	10.6	10.6	- 7.0	4272.0	4331.1	4431.9	4353.4	1.9		
MO003 Greater St Louis	334.2	334.5	352.0	367.0	9.8	13.6	13.1	13.0	12.7	12.7	- 7.1	4558.1	4388.2	4578.5	4649.3	2.0		
MO004 SW Missouri	359.7	359.0	369.1	378.2	5.1	11.0	11.0	10.8	10.3	10.3	- 6.4	3959.6	3954.0	3988.3	3896.9	- 1.6		
MO005 Missouri Area 5	418.7	419.7	422.4	445.3	6.4	10.2	10.0	10.0	9.7	9.7	- 5.3	4268.8	4199.7	4208.7	4298.6	.7		
State Total	355.1	359.5	371.7	383.6	8.0	12.2	11.9	11.8	11.5	11.5	- 6.0	4326.8	4286.3	4376.0	4391.8	1.5		
NE001 Greater Nebraska	422.2	426.4	435.3	431.1	2.1	9.6	9.2	8.8	8.7	8.7	- 9.7	4069.5	3932.3	3816.1	3753.8	- 7.8		
NE002 SE Nebraska	383.5	380.4	391.3	382.7	- .2	10.5	10.1	9.9	9.8	9.8	- 6.8	4034.5	3849.2	3884.8	3752.5	- 7.0		
NE003 Midlands	405.4	398.7	419.4	420.7	3.8	12.2	11.6	11.4	10.8	10.8	-11.1	4931.0	4617.3	4784.8	4548.6	- 7.8		
State Total	407.0	405.4	419.3	416.1	2.2	10.8	10.3	10.0	9.8	9.8	- 9.4	4386.7	4175.6	4203.0	4061.5	- 7.4		
Region Total	377.9	380.6	393.5	398.1	5.4	11.4	11.1	10.9	10.5	10.5	- 7.5	4305.0	4219.4	4274.5	4197.7	- 2.5		
CO001 Cent NE Colorado	357.0	357.9	369.7	369.7	3.6	9.9	10.1	10.1	10.1	9.7	- 2.7	3547.2	3612.9	3727.2	3573.1	.7		
CO002 SE Colorado	405.9	395.3	402.8	398.5	-1.8	10.2	10.5	10.5	10.5	10.1	- .9	4123.3	4137.5	4231.0	4010.5	- 2.7		
CO003 W Colorado	397.0	399.3	405.6	387.1	-2.5	7.9	7.9	7.8	7.6	7.6	- 3.2	3123.8	3161.2	3153.4	2948.2	- 5.6		
State Total	372.2	370.7	380.8	377.9	1.5	9.8	9.9	9.9	9.9	9.5	- 2.3	3637.1	3686.7	3781.9	3608.7	- .8		
MT001 Montana	420.7	410.6	419.8	410.3	-2.5	8.8	8.5	8.2	8.2	8.0	- 9.0	3682.6	3492.7	3439.7	3269.1	-11.2		
ND001 W North Dakota	486.9	466.5	477.9	474.0	-2.7	10.1	9.8	9.6	9.6	9.0	-10.2	4902.0	4555.8	4580.9	4286.0	-12.6		
ND002 Agassiz	410.2	410.0	427.2	412.0	.4	10.0	9.5	9.4	9.4	8.9	-11.1	4109.5	3911.1	4032.0	3667.5	-10.8		
ND003 Min-Dak	395.1	391.6	406.0	404.7	2.4	10.4	10.3	9.9	9.6	9.6	- 7.8	4128.0	4044.1	4028.6	3896.7	- 5.6		
State Total	422.9	416.6	431.6	425.6	.6	10.2	9.9	9.7	9.7	9.2	- 9.5	4317.7	4139.0	4178.1	3933.5	- 8.9		
SD001 South Dakota	420.8	414.6	428.3	426.1	1.3	10.0	9.8	9.6	9.6	9.1	- 9.2	4204.4	4081.9	4092.6	3865.1	- 8.1		
UT001 Utah	289.6	286.6	293.3	297.0	2.6	8.6	8.2	8.3	8.3	7.9	- 8.4	2489.3	2359.5	2420.7	2338.6	- 6.1		
WY001 Wyoming	395.0	378.4	391.8	388.9	-1.5	9.3	8.7	8.7	8.7	8.6	- 8.1	3691.5	3307.4	3395.9	3341.9	- 9.5		
Region Total	383.6	378.3	389.1	385.7	.5	9.6	9.5	9.3	9.3	9.0	- 6.7	3688.3	3590.2	3636.0	3459.7	- 6.2		
AZ001 Central Arizona	306.3	311.7	316.4	315.1	2.9	10.6	10.6	10.6	10.6	10.1	- 4.2	3242.8	3300.0	3355.4	3197.7	- 1.4		
AZ002 SE Arizona	344.8	333.6	335.5	343.6	- .3	11.1	10.8	10.8	10.8	10.6	- 4.9	3826.2	3613.6	3616.0	3625.4	- 5.2		
AZ003 N Arizona	289.9	283.1	269.9	280.2	-3.3	9.0	9.0	8.6	8.6	8.6	- 5.3	2620.1	2559.0	2310.4	2397.0	- 8.5		
AZ005 W Arizona	303.5	316.0	293.6	311.3	2.5	10.4	9.4	8.9	8.9	9.1	-12.7	3153.7	2969.4	2623.5	2824.4	-10.4		
State Total	315.2	315.8	317.3	320.1	1.5	10.6	10.5	10.5	10.5	10.1	- 4.8	3352.5	3320.7	3320.7	3241.1	- 3.3		
CA001 N California	346.8	346.4	350.0	350.5	1.1	8.0	7.6	7.8	7.8	7.6	- 4.0	2757.6	2618.2	2718.1	2674.8	- 3.0		
CA002 Golden Empire	306.0	310.9	313.6	308.3	.7	8.5	8.3	8.2	8.2	7.9	- 6.9	2613.1	2591.3	2559.7	2449.8	- 6.2		
CA003 North Bay	293.8	299.0	309.4	302.0	2.8	8.2	8.0	8.0	8.0	8.0	- 1.9	2404.9	2398.2	2488.5	2426.2	.9		
CA004 West Bay	300.3	301.5	305.7	311.1	3.6	10.4	10.3	10.4	10.4	10.1	- 3.4	3131.8	3118.4	3185.4	3133.7	.1		
CA005 Alameda-Contra Cos	291.7	293.9	304.8	312.3	7.0	8.9	8.8	8.7	8.7	8.9	- .7	2603.4	2592.3	2646.0	2767.4	6.3		
CA006 N San Joaquin Vly	312.8	313.8	324.5	322.0	2.9	8.4	8.1	8.3	8.2	8.2	- 2.3	2616.9	2549.6	2698.3	2631.8	.6		
CA007 Santa Clara	271.5	270.5	279.1	280.0	3.1	9.1	8.9	9.0	9.0	8.7	- 4.5	2482.9	2411.7	2508.9	2446.0	- 1.5		
CA008 Mid-Coast	292.5	287.1	291.6	293.0	-2	8.4	8.2	8.2	8.2	8.0	- 5.3	2470.1	2352.3	2389.5	2343.6	- 5.1		
CA009 Central California	297.9	304.0	311.2	313.8	5.3	7.9	7.5	7.5	7.5	7.3	- 7.0	2351.8	2283.2	2343.0	2304.1	- 2.0		
CA010 Ventura-Santa Barb	312.4	318.2	313.8	319.0	2.1	8.7	8.3	8.4	8.3	8.3	- 3.8	2708.5	2631.2	2629.7	2659.7	- 1.8		
CA011 Los Angeles	322.1	326.6	333.2	340.3	5.6	10.3	10.0	10.1	10.1	9.9	- 3.8	3310.6	3251.5	3367.8	3366.2	1.7		
CA012 Inland Counties	322.1	320.0	322.1	315.4	-2.1	9.2	8.9	8.8	8.8	8.6	- 6.4	2959.6	2834.1	2846.5	2712.8	- 8.3		
CA013 Orange County	314.4	321.8	324.7	337.3	7.3	9.5	9.3	9.4	9.4	9.2	- 3.6	2988.7	2981.3	3041.8	3091.7	3.4		
CA014 San Diego/Imperial	286.0	281.5	287.5	294.5	3.0	9.0	8.6	8.6	8.6	8.7	- 3.3	2560.8	2416.8	2475.9	2551.3	- .4		
State Total	309.3	311.6	317.3	321.1	3.8	9.4	9.2	9.2	9.2	9.1	- 4.2	2922.2	2854.9	2925.3	2906.9	- .5		

TABLE 1
Hospital-Based Measures of Short-Stay Hospital Use Adjusted for Patient Origin
of Medicare Enrollees Age 65 and Over, by Health Service Area, State, and Region, 1974-1977 (continued)

Region, State, and HSA	Discharges (per 1,000 enrollees)				Percent Change		Average Length of Stay (in days)				Percent Change		Days of Care (per 1,000 enrollees)				Percent Change	
	1974	1975	1976	1977	1974 - 1977	1977	1974	1975	1976	1977	1974 - 1977	1977	1974	1975	1976	1977	1974 - 1977	1977
HI001 Hawaii State Hlth	270.3	270.3	264.1	264.0	-2.3	10.0	9.6	9.6	9.4	9.9	-1.6	2714.1	2581.5	2474.4	2609.2	-3.9		
NV001 Greater Nevada	339.0	338.3	260.2	354.1	4.5	9.8	10.1	10.1	10.1	9.1	-7.2	3337.4	3401.5	3636.4	3236.4	-3.0		
NV002 Clark County	353.9	352.2	385.1	366.5	3.5	9.4	9.0	9.2	9.2	8.9	-4.9	3316.5	3184.6	3542.2	3264.6	-1.6		
State Total	346.3	345.2	372.9	360.6	4.1	9.6	9.5	9.5	9.6	9.0	-6.1	3326.9	3292.9	3588.7	3251.1	-2.3		
Region Total	309.6	311.6	317.0	320.4	3.5	9.6	9.3	9.3	9.4	9.2	-4.1	2964.6	2901.4	2966.1	2941.1	-8		
AK001 SE Alaska	330.0	286.3	311.7	320.1	-3.0	8.0	7.5	8.1	8.1	8.3	3.4	2651.5	2144.1	2518.2	2660.1	3		
ID001 Idaho	359.4	358.7	366.5	357.5	-.5	8.7	8.3	8.2	8.2	8.0	-7.1	3113.4	2985.3	3008.4	2877.4	-7.6		
OR001 NW Oregon	314.4	313.4	321.0	317.5	1.0	10.6	9.5	9.2	9.2	9.0	-14.7	3328.4	2972.1	2963.8	2866.8	-13.9		
OR002 W Oregon	297.9	293.1	299.6	301.8	1.3	9.0	7.8	7.6	7.6	7.6	-15.4	2673.5	2298.5	2286.1	2290.6	-14.3		
OR003 E Oregon	373.3	358.3	354.7	355.1	-4.9	9.2	7.9	7.9	7.9	7.7	-15.9	3426.1	2832.8	2797.4	2741.0	-20.0		
State Total	315.0	310.9	316.8	316.1	.3	9.8	8.7	8.4	8.4	8.3	-15.2	3083.3	2690.3	2675.8	2624.5	-14.9		
WA001 Puget Sound	306.4	308.0	307.4	306.7	.1	8.1	7.9	7.9	7.9	8.0	-9	2471.1	2448.0	2438.2	2452.0	-.8		
WA002 SW Washington	335.4	329.9	331.5	332.2	-.9	7.5	7.1	7.0	7.0	7.1	-6.3	2522.7	2331.9	2318.2	2342.5	-7.1		
WA003 Central Washington	355.9	367.4	381.5	376.0	5.6	7.0	6.8	6.8	6.8	6.6	-5.0	2489.8	2492.7	2599.2	2499.3	.4		
WA004 E Washington	359.8	356.6	368.5	365.5	1.6	7.8	7.7	7.7	7.8	7.6	-3.3	2815.4	2755.6	2855.9	2765.9	-1.8		
State Total	324.4	325.4	328.7	327.1	.8	7.8	7.6	7.6	7.6	7.6	-2.5	2535.6	2489.0	2509.4	2493.3	-1.7		
Region Total	324.7	323.2	328.1	326.2	.5	8.6	8.1	8.0	8.0	7.9	-8.0	2797.3	2612.0	2623.9	2584.5	-7.6		
US Total	324.7	328.9	339.7	346.1	6.6	11.6	11.3	11.2	11.2	10.9	-5.5	3754.7	3708.7	3796.8	3783.8	.8		

FIGURE 4
Distribution of Health Service Areas by Percent Change in
Discharge, ALOS, and Days-of-Care Rates, U.S., 1974-1977



The discharge rates were examined for the 10 health service areas with the greatest declines and the 10 with the greatest increases during the 1974 to 1977 period. The 10 health service areas with the greatest declines during the 1974 to 1977 period had an average discharge rate of 371 in 1974, whereas the 10 areas with the greatest increases in the discharge rate had an average of 277 discharges in 1974. Table 2 shows the areas with the largest percentage increases and decreases.

TABLE 2

Health Service Areas with the Greatest Changes in Discharge Rates of Medicare Enrollees Age 65 and Over from 1974 to 1977

	Discharges (per 1,000 enrollees)		
	Greatest Decreases		
Health Service Area	1974	1977	Percent Change 1974-1977
Oregon 3	373	355	- 4.9
Minnesota 2	423	409	- 3.4
Arizona 3	290	280	- 3.3
Alaska 1	330	320	- 3.0
North Dakota 1	487	474	- 2.7
Colorado 3	397	387	- 2.5
Montana 1	421	410	- 2.5
Minnesota 5	394	385	- 2.5
Hawaii 1	270	264	- 2.3
California 12	322	315	- 2.1
Average	371	360	- 3.0
Greatest Increases			
Maryland 3	276	334	21.0
New Jersey 3	262	309	18.2
Pennsylvania 2	243	280	15.0
Maryland 5	265	305	15.0
Tennessee 5	346	398	14.9
Florida 8	307	352	14.5
Georgia 3	306	350	14.3
South Carolina 4	273	312	14.3
Maryland 4	244	278	13.7
Alabama 2	358	406	13.4
Average	286	333	16.4

In addition, each health service area was ranked by its 1974 discharge rate and by the percent change from 1974-1977. A Spearman rank order correlation coefficient was computed using these two rankings. A significant ($P = 0.05$) correlation coefficient of $- .41$ was found, indicating that areas that ranked high on discharge rates in 1974 tended to show the greatest percent declines in the rate. Thus, the hypothesis is confirmed. To some extent the decline may be due to regression toward the mean—the tendency in certain situations for areas with extreme values on a variable in one year to show less extreme values in a subsequent year.

For ALOS, the hypothesis does not appear to hold true. The 10 areas with the greatest declines during the period 1974 to 1977 had an ALOS of 10.5 days in 1974, while the 10 areas with the greatest increases had an ALOS of 12.5 days in 1974. Table 3 shows the areas with the greatest percentage increases and decreases in ALOS during the 1974 to 1977 period.

TABLE 3

Health Service Areas with the Greatest Changes in Average Length of Stay of Medicare Enrollees Age 65 and Over from 1974 to 1977

ALOS			
Greatest Decreases			
Health Service Area	1974	1977	Percent Change 1974-1977
Oregon 3	9.2	7.7	- 15.9
Oregon 2	9.0	7.6	- 15.4
Oregon 1	10.6	9.0	- 14.7
Alabama 1	10.4	9.0	- 12.9
Arizona 5	10.4	9.1	- 12.7
Wisconsin 1	11.3	9.9	- 12.6
Minnesota 6	10.0	8.7	- 12.6
Michigan 6	11.4	10.0	- 11.9
Wisconsin 3	12.6	11.2	- 11.7
Wisconsin 5	10.4	9.2	- 11.6
Average	10.5	9.1	- 13.3
Greatest Increases			
New York 2	12.5	13.3	5.9
New York 8	13.5	14.2	5.2
New Jersey 4	13.1	13.6	3.7
Alaska 1	8.0	8.3	3.4
New Jersey 5	13.5	13.9	3.1
Maryland 3	12.3	12.7	2.6
Massachusetts 4	13.1	13.4	2.3
District of Col. 1	14.2	14.3	1.2
New Jersey 1	13.7	13.9	1.1
Vermont 1	10.9	10.9	- .4
Average	12.5	12.9	3.2

The Spearman rank order correlation coefficient was computed for ALOS in a manner similar to the discharge rate. The correlation coefficient was found not to be significant.

For days of care, the hypothesis does not appear to hold true. The 10 health service areas in 1974 with the greatest decline in the rate of days of care during this period averaged 4,018 days per 1,000 enrollees in 1974 compared to the 10 areas with the greatest increases which averaged 3,507 days per 1,000 enrollees in 1974. The States of New Jersey and Maryland each showed three areas with high increases. Table 4 shows the health service areas with extreme percentage increases and decreases for the rate of days of care for the period.

TABLE 4

Health Service Areas with the Greatest Changes in Days of Care Rates of Medicare Enrollees Age 65 and Over from 1974 to 1977

	Days of Care (per 1,000 enrollees)		
	Greatest Decreases		
Health Service Area	1974	1977	Percent Change 1974-1977
Oregon 3	3,426	2,741	- 20.0
Oregon 2	2,674	2,291	- 14.3
Minnesota 2	4,842	4,158	- 14.1
Oregon 1	3,328	2,867	- 13.9
North Dakota 1	4,902	4,286	- 12.6
Wisconsin 3	4,380	3,864	- 11.8
Wisconsin 5	4,143	3,669	- 11.4
Montana 1	3,683	3,269	- 11.2
Minnesota 4	3,985	3,549	- 10.9
North Dakota 2	4,110	3,668	- 10.8
Average	3,947	3,436	- 12.9
	Greatest Increases		
Maryland 3	3,406	4,228	24.1
New York 8	3,332	3,928	17.9
New Jersey 3	4,107	4,794	16.7
New York 2	3,557	4,103	15.3
New Jersey 5	3,718	4,240	14.0
Maryland 4	3,412	3,841	12.6
Maryland 5	2,931	3,267	11.5
District of Col. 1	3,544	3,946	11.3
New Jersey 4	3,496	3,890	11.3
New Jersey 1	3,569	3,939	10.4
Average	3,417	3,963	12.7

The Spearman rank order correlation coefficient was also computed for days of care in a manner similar to that of the discharge rate. The correlation coefficient was found to be not significant.

Cross-Sectional Analysis of Hospital Use by Health Service Area, 1977

A cross-sectional analysis of hospital use by HSA areas for 1977 indicates a wide range in all three measures of use.

Discharge Rates

An examination of discharge rates in 1977 by health service area (Table 1) reveals an almost two-fold difference between the lowest rate of 264 discharges per 1,000 enrollees in the Connecticut 2 area and the highest discharge rate of 508 discharges per 1,000 in the Kansas 1 area.⁴ Table 5 shows the 20 areas with the highest and the 20 areas with the lowest discharge rates in 1977. The 20 areas with the highest rates are predominately large rural areas located in the central and southern parts of the country. Of the 20 areas with the lowest discharge rates, 16 are in the East and include the health service areas consisting of Baltimore, Washington, D.C., and New York City.

TABLE 5

Health Service Areas with the Highest and Lowest Short-Stay Hospital Discharge Rates of Medicare Enrollees Age 65 and Over, 1977

Health Service Area	Number of Discharges (per 1,000 enrollees)
	Highest Ranking
Kansas 1	508
Texas 4	478
Texas 10	477
North Dakota 1	474
Texas 2	471
Arkansas 2	453
Kansas 3	452
Texas 1	448
Mississippi 1	446
Missouri 5	445
Arkansas 4	443
Texas 12	438
Florida 1	435
Texas 7	434
Louisiana 2	433
Nebraska 1	431
Louisiana 1	429
South Dakota 1	426
Arkansas 1	424
Alabama 1	423
Georgia 7	423
Health Service Area	Number of Discharges (per 1,000 enrollees)
	Lowest Ranking
Hawaii 1	264
Pennsylvania 4	264
Connecticut 2	264
District of Columbia 1	275
New York 8	276
Maryland 4	278
Connecticut 3	280
California 7	280
Arizona 3	280
Pennsylvania 2	280
New Jersey 1	284
New Jersey 4	287
Maryland 2	288
New York 7	289
Connecticut 7	290
Delaware 1	291
Florida 7	293
California 14	295
Massachusetts 5	296
Rhode Island 1	296
South Carolina 2	296

The data in Table 6 were compiled to determine the amount of variation within the Department of Health and Human Services' (DHHS') regions. The table shows the highest and lowest values for the discharge rate, average length of stay, and days of care rate found in health service areas within regions.

Within the Denver region, the difference in the discharge rate between the highest and lowest areas was 177 discharges per 1,000 enrollees. Atlanta, Dallas, and Kansas City regions followed with differences of 153, 148, and 141, respectively. By way of comparison, the difference in the regional discharge rate between the lowest region (New York) and the highest region (Dallas) was 110 discharges per 1,000.

⁴Only health service areas in the 50 States were considered.

TABLE 6
Discharge Rates, Average Lengths of Stay,
and Days-of-Care Rates of Medicare Enrollees Age 65
and Over by DHHS Region, 1977

DHHS Region and Health Service Area	Number of Discharges (per 1,000 enrollees)	Rank ¹	Avg. Length of Stay (days)	Rank ¹	Number of Days of Care (per 1,000 enrollees)	Rank ¹
Total U.S.	346		10.9		3784	
Boston	319	2	12.1	8	3850	6
High	366 (VT 1)		13.5 (MA 3)		4495 (MA 3)	
Low	261 (CT 2)		9.6 (CT 5)		2815 (CT 3)	
New York ²	296	1	14.5	10	4306	10
High	369 (NY 4)		16.6 (NY 7)		5083 (NY 1)	
Low	276 (NY 8)		12.2 (NY 4)		3890 (NJ 4)	
Philadelphia	322	4	12.3	9	3971	7
High	391 (WV 1)		14.3 (DC 1)		4303 (PA 1)	
Low	264 (PA 4)		10.2 (PA 5)		3264 (PA 4)	
Atlanta	366	7	10.0	5	3645	4
High	446 (MS 1)		12.1 (TN 6)		4460 (MS 1)	
Low	293 (FL 7)		7.8 (GA 2)		2697 (FL 7)	
Chicago	347	6	11.5	7	4009	8
High	415 (IL 3)		13.5 (IL 7)		4580 (IL 3)	
Low	313 (WI 2)		8.7 (MN 6)		3269 (MI 4)	
Dallas	406	10	9.3	4	3789	5
High	478 (TX 4)		12.0 (LA 1)		4666 (TX 10)	
Low	330 (NM 1)		8.0 (AR 2)		2829 (NM 1)	
Kansas City	398	9	10.5	6	4198	9
High	508 (KS 1)		12.7 (MO 3)		4929 (KS 1)	
Low	367 (MO 3)		8.7 (NB 1)		3691 (IA 1)	
Denver	386	8	9.0	2	3460	3
High	474 (ND 1)		10.1 (CO 2)		4286 (ND 1)	
Low	297 (UT 1)		7.6 (CO 3)		2339 (UT 1)	
San Francisco	320	3	9.2	3	2941	2
High	367 (NV 2)		10.6 (AZ 2)		3625 (AZ 2)	
Low	264 (HI 1)		7.3 (CA 9)		2304 (CA 9)	
Seattle	326	5	7.9	1	2585	1
High	376 (WA 3)		9.0 (OR 1)		2877 (ID 1)	
Low	302 (OR 2)		6.6 (WA 3)		2291 (OR 2)	

¹ Rank is low to high

² Excludes Puerto Rico and the Virgin Islands

Average Length of Stay

The highest average length of stay in 1977 was found in the New York 7 health service area (16.6 days) and was nearly 2.5 times as great as the lowest rate of 6.6 days in the Washington 3 health service area. Fourteen of the 20 areas with the highest values of ALOS are in the Northeast and 18 of the 22 areas with the lowest values are in the West (Table 7). There are six areas (New York 7, New Jersey 1, New York 8, Maryland 4, District of Columbia 1, and New Jersey 4) which appeared on both the highest-ranked list for ALOS and the lowest-ranked list for the discharge rates—reflecting the inverse relationship that often exists between the two measures.

According to the data in Table 6, considerable variations exist in ALOS with the DHHS regions. In the Chicago region, for example, the difference in ALOS between the area with the highest average of 13.5 days (Illinois 7) and the lowest average of 8.7 days (Minnesota 6) was 4.8 days—a range approaching the 6.6 day difference between the overall ALOS values for the New York (14.5 days) and Seattle (7.9 days) regions. In all regions, differences between the highest and lowest areas in ALOS were 2.4 days or more.

TABLE 7

**Health Service Areas with the Highest and Lowest
Average Lengths of Stay of Medicare Enrollees Age 65
and Over in Short-Stay Hospitals, 1977**

Health Service Area	Average Length of Stay (in days)
	Highest Ranking
New York 7	16.6
New York 1	16.1
New Jersey 3	15.5
District of Columbia 1	14.3
New York 8	14.2
New York 5	14.0
Pennsylvania 1	14.0
New Jersey 1	13.9
New Jersey 5	13.9
Maryland 4	13.8
New Jersey 2	13.7
New Jersey 4	13.6
New York 6	13.6
Massachusetts 3	13.5
Illinois 7	13.5
Massachusetts 4	13.4
New York 2	13.3
Virginia 4	13.2
New York 3	13.1
Michigan 1	13.0
	Lowest Ranking
Washington 3	6.6
Washington 2	7.1
California 9	7.3
Colorado 3	7.6
California 1	7.6
Oregon 2	7.6
Washington 4	7.6
Oregon 3	7.7
Georgia 2	7.8
Utah 1	7.9
California 2	7.9
Georgia 6	7.9
Arkansas 2	8.0
Montana 1	8.0
California 3	8.0
California 8	8.0
Idaho 1	8.0
Washington 1	8.0
California 6	8.2
Texas 12	8.3
California 10	8.3
Alaska 1	8.3

Days of Care

The highest rate of days of care for a health service area in 1977 was in New York 1, with 5,083 days of care per 1,000 enrollees and which was 2.2 times as great as the lowest rate of 2,291 in the Oregon 2 area (Table 1). With few exceptions, areas with a high days-of-care rate are located in the Northeast or Midwest, as shown in Table 8. The lowest rates of days-of-care are found entirely in the West. California alone, accounts for 10 of the 20 areas with the lowest rates.

Similar to the findings for the discharge rate and ALOS, substantial variations are found in the days-of-care rates in health service areas within regions (Table 6). Region 8 (Denver) had the greatest variation (1,947), ranging from 2,339 days per 1,000 enrollees in the lowest area to 4,286 days per 1,000 in the highest area in the region. In 6 of the 10 regions, differences in the days-of-care rate between the highest and lowest areas were 28.0 percent or more. Thus, analysis of these data by health service area indicates strikingly large differences within regions for all three measures of use.

TABLE 8

**Health Service Areas with the Highest and Lowest
Short-Stay Hospital Days-of-Care Rates of Medicare
Enrollees Age 65 and Over, 1977**

Health Service Areas	Days of Care (per 1,000 enrollees)
	Highest Ranking
New York 1	5,083
Kansas 1	4,929
New York 7	4,813
New Jersey 3	4,794
New York 5	4,768
Texas 10	4,666
Missouri 3	4,649
Illinois 3	4,580
Nebraska 3	4,549
Illinois 7	4,524
Michigan 5	4,513
New York 4	4,511
Massachusetts 3	4,495
Kansas 3	4,469
Massachusetts 2	4,468
Mississippi 1	4,460
Michigan 1	4,414
Illinois 2	4,412
New York 6	4,389
Missouri 2	4,353
	Lowest Ranking
Oregon 2	2,291
California 9	2,304
Utah 1	2,339
Washington 2	2,343
California 8	2,344
Arizona 3	2,397
California 3	2,426
California 7	2,446
California 2	2,450
Washington 1	2,452
Washington 3	2,499
California 14	2,551
Hawaii 1	2,609
California 6	2,632
Alaska 1	2,660
California 10	2,660
California 1	2,675
California 12	2,713
Oregon 3	2,741
Washington 4	2,766

Regression Results

A previous analysis of relationships between use and area characteristics in PSRO areas was published in the HCFA Review (Deacon, et al., 1979). The analysis indicated that the percent of the aged enrollees over age 75, population density, occupancy rates, physician supply, and the influence of teaching hospitals, were correlated with certain use measures. Table 9 shows partial correlation coefficients derived from the regression models for the discharge rate, ALOS, and days-of-care rate in health service areas. The results of these data were very similar to those of the PSRO study. Correlations involving age distribution, population density, hospital occupancy, physician supply, and percent of admissions to teaching hospitals were consistent with the PSRO analysis.

The proportion of enrollees age 75 and over correlated positively with the days-of-care rate, confirming earlier analyses of Medicare data which have shown that both discharge rates and ALOS, hence, days-of-care rates increase with age. Population density correlated positively with ALOS suggesting that in sparsely populated areas a higher proportion of the hospital case load is made up of patients with less severe illnesses which require shorter stays. This may be due to tendencies in rural areas—where there are fewer physicians and greater distances—to hospitalize patients with conditions that would be treated on an ambulatory basis elsewhere. There was a slight correlation between the percentage of admissions to teaching hospitals and ALOS, revealing the impact of more complicated case loads and training programs. The number of physicians in a health service area correlated negatively with the discharge and days-of-care rates, suggesting the effect of ambulatory care as an alternative to inpatient care. As in the PSRO study, hospital occupancy rates correlated positively with ALOS and the days-of-care rate, and correlated negatively with the discharge rate. The HSA analysis differed from the PSRO results in two ways. Although very slight, there was a positive correlation between the percentage of non-white enrollees in HSA areas and the discharge rate—perhaps reflecting the fact that most blacks live in the South which has the highest Medicare discharge rate. In addition, for reasons not clearly understood, the supply of nursing home beds in health service areas correlated positively with the discharge rate and days-of-care rate.

The regression models explained 76 percent of the variation in ALOS, 43 percent of the variation in the discharge rate, and 34 percent of the variation in the days-of-care rate.

TABLE 9
Partial Correlation Coefficient and P Values
(in parentheses) of Average Length of Stay, Discharge
Rate, and Days-of-Care Rate with Independent Variables
for All Health Service Areas, 1976

	ALOS	Discharge Rate	Days-of-Care Rate
Age (percent 75 and over)			.15 (.005)
Race (percent non-white)		.16 (.01)	
Population Density (per square mile)	.36 (.0001)		
Nursing Home Beds (per 1,000 enrollees)		.21 (.002)	.14 (.025)
Physicians (per 1,000 enrollees)		– .25 (.0001)	– .26 (.0001)
Teaching Hospitals (percent admission)	.18 (.005)		
Occupancy (percent)	.75 (.0001)	– .28 (.0001)	.43 (.0004)

Summary and Discussion

Over the 1974–1977 period, the discharge rate for the nation grew 6.6 percent from 325 to 346 discharges per 1,000 enrollees, while the average length of stay dropped 5.5 percent from 11.6 to 10.9. These opposing trends have nearly offset each other with the result that the rate of days of hospital care has increased only slightly from 3,755 to 3,784 days-of-care per 1,000 enrollees—a 0.8 percent increase. This national pattern was generally followed by individual health service areas, with most areas experiencing a rise in the discharge rate and a drop in average length of stay. The net result was that in 99 areas the days of care rate decreased, and in 103 areas, the rate increased, with a majority experiencing a change of 4 percent or less during the period 1974–1977.

A cross-sectional examination of hospital use measures revealed great variation among health service areas. The highest discharge rates were most often found in health service areas having large rural areas in the central and southern parts of the country; the lowest rates were found largely in the Northeast. Areas with high average lengths of stay were generally found in the Northeast; low values were found in areas in the West. Most areas with high values of days-of-care rates were in the Northeast or Midwest; nearly all 20 areas with low days-of-care rates were in the West.

This study found significant relationships between demographic and health resource variables and measures of hospital use. The health resource variables found to be related to hospital use were physician supply, hospital occupancy, and teaching status. To the extent HSAs can influence these variables, they may be able to alter hospital use rates.

In the process of identifying and dealing with problems in patterns of hospital use in an area, there is very likely a need for cooperative efforts between HSAs and PSROs. Through its review of patterns of hospital care, a PSRO may identify problems over which an HSA might have more influence on solutions than would a PSRO. For example, unnecessarily long hospital stays may reflect a lack of available post-hospital extended care services. Thus, there is a clear need for exchange of information and cooperation between programs, such as PSROs, that review in-hospital care and planning programs that focus on improving the overall health care delivery system.

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Data Sources

Medicare data used in this report were derived primarily from three basic files maintained centrally in the Health Care Financing Administration's Medicare Statistical System:

1. The master enrollment file contains information about all Medicare enrollees including age, sex, race, and State and county of residence.
2. The hospital bill file contains information taken from the claim submitted for payment, including dates of admission and discharge.
3. The provider file contains information about certified Medicare providers such as the location of the hospital, number of beds, and teaching status.

For 100 percent of hospital stays in the nation, one record was created that contained information taken from all three files listed above. Two additional data elements were incorporated into the record to indicate (1) the health service area in which the patient resided, and (2) the health service area in which the hospital stay occurred.

All hospital stays that occurred in the period 1974 through 1977 and processed as of March 1978 were included in the file. The file contains about 95 percent of all hospital stays in a year within 3 months after the end of the year, and about 98 to 99 percent within 15 months after the end of the year. Although there was only a small shortfall in the file, another more current file (query file) was used to correct the shortfall. The query file comes from the system employed by fiscal intermediaries to query the Medicare central office on eligibility and benefits available to Medicare patients admitted to a hospital. This file, which contains nearly a complete count of all admissions within a month after they occur, was used in conjunction with the hospital bill file to obtain complete counts of hospital stays.

Limitations in Methodology to Produce Hospital-Based Rates

The need to develop information to compare the rate of hospital use in one area with the rate of hospital use in another area, as well as to analyze changes over time, led to the development of a method to produce hospital-based measures. The validity of this method depends upon the basic assumption that a population-at-risk can be constructed by observing where the patients come from. Although future efforts could refine the calculation, for example, by taking into account the characteristics of the patients, such as age, sex, and race, and relating them to the allocation of enrollees, there would remain some limitations that are inherent in the basic approach.

One inherent limitation is that hospital-based rates as constructed here are subject to a "dampening" phenomenon. If, for example, the number of discharges in a specific health service area is reduced due to HSA activity—while the number of hospital stays remains constant in all other areas—the new discharge rate for the second year in the area in which use was reduced will register a smaller percentage reduction than actually occurred.

This result stems from the methods used to generate the denominator for the rate. Because the proportion of total discharges in the area declined, the number of enrollees allocated to the population-at-risk to services in that area automatically declines. At the same time, the other areas are necessarily allocated more enrollees, thus decreasing their discharge rate.

Another limitation of the methodology is that different estimates for population-at-risk result when different geographic units are used. For example, the population-at-risk for a particular area will be different depending on whether data on patient origin are aggregated by health service area or county.

Sampling Errors

In the calculation of enrollees-at-risk required for hospital-based rates, the information contained in the patient-origin matrix is based upon a 20 percent sample file of inpatient bills. Thus, there is a sampling error associated with the estimated number of enrollees-at-risk in each health service area. The error is given by the following formula:

$$\text{Variance of } E_i = \sum_{j=1}^n \frac{d_{ij} D_j - d_{ij}^2}{.2D_j^3} e_j^2$$

where E_i = Estimated total number of Medicare enrollees at risk in the i th health service area.

d_{ij} = number of discharges from hospitals in the i th HSA area of patients who resided in the j th area.

D_j = total number of discharges of patients who resided in the j th area.

$$(D_j = \sum_{K=1}^n d_{kj})$$

e_j = Medicare enrollment in the j th area.

n = total number of areas.

Since the denominator used for the rate calculation (enrollees-at-risk) is an estimate, the rate itself is an estimate of which the standard error is given by:

$$\frac{K_2}{E_i} (\text{Variance } E_i)^{1/2}$$

Where K in the numerator of the expression above is either discharges or days-of-care. Table T1 which contains the standard errors for both the discharge rate and days-of-care rate for all health service areas is available upon request.

Appendix A

Example Illustrating Adjustment for Patient Migration

Diagram 1 represents a hypothetical configuration using only four health service areas. The number of enrollees-at-risk to hospital care in area 1 is calculated by allocating a portion of the enrollees from each of the four areas. The proportion is based upon the fraction of total discharges for residents of each of the four areas which occurred in hospitals in health service area 1.

DIAGRAM 1

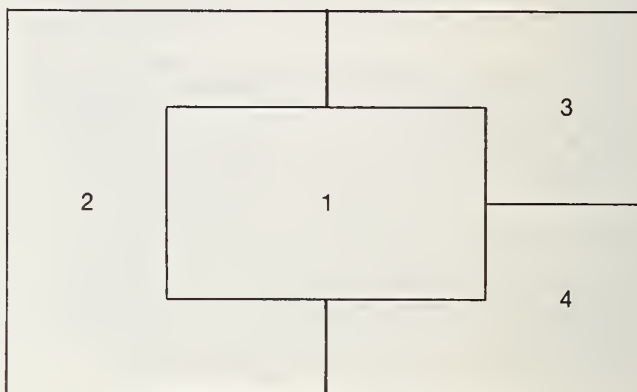


Table A shows the total number of discharges for residents of each of four health service areas and the location of the hospitals in which the discharges occurred. Suppose among residents of area 1 there was a total of 32,500 discharges of which 30,000 were from hospitals located in area 1; 500 discharges from hospitals in area 2; 1,250 discharges from hospitals in area 3; and 750 discharges from hospitals in area 4. Similarly, for residents of area 4, there was a total of 30,250 discharges of which 4,000 were from hospitals in area 1 and 150 from hospitals in area 2; 100 from hospitals in area 3; and 26,000 from hospitals in area 4.

TABLE A
Patient Origin Matrix

Health Service Area Where Discharge Occurred	Discharges of Residents in Health Service Areas				Total
	Area 1	Area 2	Area 3	Area 4	
Area 1	30,000	6,000	5,000	4,000	45,000
Area 2	500	5,750	500	150	6,900
Area 3	1,250	1,000	20,000	100	22,350
Area 4	750	250	200	26,000	27,200
Total	32,500	13,000	25,700	30,250	101,450

To estimate the population-at-risk in area 1, the proportion of total discharges from hospitals in area 1 is determined for each possible area of residence. A fraction of enrollment from each area is then allocated to area 1 based upon the fraction of discharges that occurred in area 1. The calculation is demonstrated in Table AA.

TABLE AA
Calculation of the Population at Risk

(1)	(2)	(3)	(4)	(5)	(6)
Residence of Enrollee	Total Discharges	Discharges from Hospitals in Health Service Area 1	(3) + (2) Proportion of Total Discharges from Hospitals in Health Service Area 1	Medicare Enrollment	(4) × (5) Enrollment Allocated to Health Service Area 1
HSA Area 1	32,500	30,000	.92	75,000	69,000
HSA Area 2	13,000	6,000	.46	30,000	13,800
HSA Area 3	25,700	5,000	.19	30,000	5,700
HSA Area 4	30,250	4,000	.13	50,000	6,500
Total	101,450	45,000		185,000	95,000

Appendix B

Interstate Health Service Areas

Health Service Area Redesignations

The health service area designations employed in this report are not always the official ones. The codes used in this report were designated by the Bureau of Health Planning to allow statistics for health service areas to be displayed using county-based data systems (such as the Medicare Statistical System). There are 205 areas as a result of these redesignations. This set of health service area codes is referred to as "data-oriented" health service areas.

Split Counties

In the "data-oriented" scheme, when a county is divided among two or more health service areas, data for the entire county are placed in one health service area. The following list shows how health service areas with part of a county are defined.

Health Service Area Codes	Counties Included in Data-Oriented Health Service Area
AK 1	All divisions in Alaska are included
AK 2	Area not defined
AK 3	Area not defined
AZ 1	Gila, Maricopa, Pinal
AZ 2	Cochise, Graham, Greenlee, Pima, Santa Cruz
AZ 3	Apache, Cochino, Navajo, Yavapai
AZ 4	Area not defined
CT 1	Fairfield
CT 2	New Haven
CT 3	Middlesex, New London, Windham
CT 4	Hartford, Tolland
CT 5	Litchfield
IL 6	Area not defined. Chicago is included in Cook
IL 7	Cook, Dupage
MA 1	Berkshire, Franklin, Hampden, Hampshire
MA 2	Worcester
MA 3	Essex, Middlesex
MA 4	Norfolk, Suffolk
MA 5	Barnstable, Bristol, Dukes, Nantucket, Plymouth
MA 6	Area is not defined. The part counties of Essex and Middlesex are included in MA 003.
NM 1	All counties in New Mexico
UT 1	All counties in Utah

Health service areas that comprise parts of two States are assigned two codes, one for each State. However, in the data-oriented scheme, such areas are listed under only one code. The following list shows how interstate health service areas are designated:

Official Area Codes	Data-Oriented Health Service Area Codes
GA 1, TN 3	TN 3
GA 4, SC 5	GA 4
GA 5, AL 7	GA 5
IA 1, NE 4	IA 1
NE 3, IA 2	NE 3
IA 3, IL 10	IA 3
Official Area Codes	Data-Oriented Health Service Codes
OH 1, KY 3	OH 1
ND 2, MN 1	ND 2
WI 7, MN 2	MN 2
ND 3, MN 3	ND 3
MO 1, KS 4	MO 1
MO 3, IL 11	MO 3
NY 4, PA 8	NY 4
TN 1, VA 6	TN 1
AZ 4, NM 2, UT 2	Area is not defined

The Statewide use figures for States with interstate health service areas reflect the way interstate areas are designated. For example, the Georgia counties in health service area, GA1/TN3, would be included in the Tennessee Statewide discharge rate and not in the Georgia rate since the area is listed under Tennessee, not Georgia. The following table compares the "state" use totals with the actual State figures.

TABLE B
"Data-Oriented" Hospital Use Measures Compared with Actual State Figures for States
with Interstate Health Service Areas, 1977

State	Discharges (per 1,000 enrollees)		Average Length of Stay		Days of Care (per 1,000 enrollees)	
	Data-Oriented State Figure	Actual State Figure	Data-Oriented State Figure	Actual State Figure	Data-Oriented State Figure	Actual State Figure
Alabama	394	394	9.5	9.5	3762	3738
Arizona	320	321	10.1	10.0	3241	3211
Georgia	374	374	9.0	8.9	3356	3325
Illinois	357	359	12.0	11.9	4292	4274
Iowa	382	388	9.7	10.0	3713	3883
Kansas	451	440	10.0	11.2	4506	4932
Kentucky	385	378	9.9	10.0	3817	3784
Minnesota	378	371	10.1	10.0	3831	3710
Missouri	384	384	11.5	11.4	4392	4379
Nebraska	416	410	9.8	9.7	4062	3972
New York	302	303	15.1	15.0	4572	4542
North Dakota	426	443	9.2	9.5	3934	4209
Ohio	333	333	12.0	11.9	3987	3959
Pennsylvania	318	319	12.6	12.5	3993	3984
South Carolina	326	326	10.2	10.8	3312	3525
Tennessee	389	389	10.3	10.3	4012	4005
Utah	297	296	7.9	8.0	2339	2370
Virginia	338	337	11.9	11.9	4039	4013
Wisconsin	340	342	10.8	10.7	3661	3659
Wyoming	389	389	8.6	8.6	3342	3348

Those areas exempt from designating HSAs are included as whole state health service areas in the data-oriented scheme. They are:

RI 1 Rhode Island
DC 1 District of Columbia
HI 1 Hawaii
PR 1 Puerto Rico

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